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## **Exploring self-reported eating disorder symptoms in autistic men**

### **Running Title: Eating disorder symptoms in autistic men**

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### **Author confirmation statement**

EK & FS designed the study, supervised by CS & KT. FS oversaw data collection. EK carried out the analysis. All authors contributed towards the drafting of the manuscript. All co-authors have reviewed and approved of the manuscript prior to submission. The manuscript has been submitted solely to this journal and is not published, in press, or submitted elsewhere.

### **Author disclosure statements**

No competing financial interests exist.

### **Abstract**

**Background:** Whilst research suggests a relationship between restrictive eating disorders and autism, there is a lack of research in this area from the perspective of autistic men. Our aim was to explore whether eating disorder symptoms are heightened in autistic men.

**Methods:** We recruited 103 autistic and non-autistic participants through an online study. We assessed eating disorder symptoms, autistic features, anxiety, depression and BMI using self-report measures.

**Results:** Autistic men ( $n=54$ ) exhibited significantly higher levels of eating disorder symptoms in the areas of eating ( $p < .01$ ), shape ( $p < .01$ ) and weight ( $p < .05$ ) concerns, and the global score ( $p < .05$ ). However, autistic men scored significantly lower in the area of dietary restraint ( $p < .05$ ). Global eating disorder scores did not correlate with autistic traits, but did correlate with anxiety and BMI in the autistic group.

**Conclusions:** This exploratory study suggests that heightened eating disorder symptoms in autistic men may be related to heightened levels of anxiety and higher BMIs in autism, rather

than autism itself. It also highlights that autistic men may experience eating disorder symptoms not relating to dietary restraint. Future research should consider further exploring the relationship between anxiety, BMI and disordered eating in autism.

## **Introduction**

The relationship between autism and eating problems in children is well established <sup>1,2</sup>. There is comparatively less research in adults, although there is a growing interest in the relationship between autism and eating disorders (EDs). Research suggests that women with anorexia nervosa (AN) exhibit higher prevalence rates of diagnosed autism than the general population, with around 1 in 4 women with AN qualifying for an autism diagnosis <sup>3-5</sup>. However, comparatively less research has examined the relationship between autism and EDs from the opposite perspective: exploring the presence of ED symptoms in autistic adults.

A recent study found that ED symptomatology appeared to be heightened in autistic individuals <sup>6</sup>. Of the participants in the sample reporting a current or previous ED, the male:female ratio was 1:2.5. In the general population men are thought to represent around 1 in 4 to 1 in 5 of people with EDs, suggesting that the gender ratio of EDs in autistic populations may be less skewed <sup>7,8</sup>. Nonetheless, previous research on autism in EDs has been carried out almost exclusively on female patients only. Whilst this reflects the fact that EDs predominantly affect women, autism is characterised by the opposite gender ratio and predominantly affects men <sup>9</sup>. Therefore, the aim of our study was to explore whether ED symptoms are heightened in autistic men.

## **Methods**

### ***Procedure***

We invited autistic and non-autistic people aged over 18 in the community to take part in a study titled “Problematic Eating on the Autism Spectrum”. We recruited participants online

through posts on social media (Twitter) inviting participants to complete questionnaires on a survey website. Ethical approval was received from King's College London Psychiatry, Nursing and Midwifery Research Ethics Panel, reference LRS-17/18-5292.

### *Participants*

A total of 124 individuals (56 non-autistic men and 68 autistic men) completed the questionnaires. We identified participants as autistic in this study if they self-reported being on the autism spectrum, and the AQ-Short suggested heightened levels of autistic traits. We identified participants as non-autistic if they reported having never been diagnosed as autistic, and if they scored below the cut-off indicative of heightened levels of autistic traits on the AQ-Short. Participants not meeting these group criteria were excluded, leaving a sample of 54 autistic men and 49 non-autistic men.

### *Measures*

Participants self-reported demographic data and ED history. We calculated BMI from self-reported weight and height: an underweight BMI was defined as  $< 18.5$ , an overweight BMI defined as  $\geq 25$ , and an obese BMI defined as  $\geq 30$ .

#### *Eating Disorder Examination Questionnaire (EDE-Q)*

The EDE-Q is a widely used self-report measure of ED behaviours assessing the presence of disordered eating attitudes and behaviours over the past 28 days<sup>10</sup>. This provides four subscale scores: Restraint, Eating Concern, Shape Concern and Weight Concern, as well as a Global summary score. A higher score indicates higher levels of ED pathology. In line with previous research in this area, a cut-off of  $\geq 4$  for each subscale was used as a marker of clinical significance<sup>11</sup>.

### *AQ-Short*

The AQ-Short is an abridged, 28 item version of the Autism Spectrum Quotient (AQ), a self-report measure of autistic traits in adults<sup>12</sup>. The scale contains 28 descriptive statements, to which participants respond on a Likert scale. A higher score indicates higher levels of autistic traits, with a cut-off score of >65 potentially indicating autism.

### *Hospital Anxiety and Depression Scale (HADS)*

The HADS is a 14 item self-report scale designed to assess the presence of anxiety and depression in adults<sup>13</sup>. Participants respond to descriptive statements on a Likert scale, with a higher score indicating higher levels of anxiety or depression.

## ***Data Analysis***

We made statistical comparisons in Stata (Version 15) using non-parametric tests after Shapiro-Wilk tests indicated non-normal distribution. We calculated group differences using Mann-Whitney U tests and Chi-Square tests as appropriate. We calculated Spearman's Rho coefficients to explore associations between EDE-Q Global summary scores and autistic traits, anxiety, depression and body mass index (BMI) for the autistic group.

## **Results**

Participant characteristics are summarised in Table 1. Mann-Whitney U-tests revealed that autistic participants were significantly older than the non-autistic group ( $U = 986.5, p < .05$ ). There was additionally a significant difference in BMI, with autistic participants reporting a significantly higher BMI compared to the non-autistic group ( $U = 817.5, p < .01$ ). Autistic men were significantly more likely to be in an obese BMI range ( $\chi^2(1) = 8.61, p < .01$ ), and significantly less likely to be in a normal BMI range ( $\chi^2(1) = 10.51, p < .01$ ), compared to non-

autistic men. There were no significant differences between groups in the underweight and overweight BMI range categories. Autistic men scored significantly higher than non-autistic men on the AQ-Short ( $U = 0, p < .01$ ), on the HADS anxiety scale ( $U = 529.5, p < .01$ ), and on the HADS depression scale ( $U = 530, p < .01$ ).

No non-autistic man reported being currently diagnosed with an ED, but 2 did report having previously recovered. One autistic man reported having a current ED diagnosis, and 6 reported having recovered. However, autistic men were not significantly more likely to have any lifetime experience of an ED.

Group differences in ED symptomatology are summarised in Table 2. Autistic participants reported significantly higher mean scores on the Eating ( $U = 801.5, p < .01$ ), Shape ( $U = 888.5, p < .01$ ), and Weight Concern subscales ( $U = 829, p < .05$ ), and the Global score ( $U = 1021, p < .05$ ), compared to non-autistic men. However, autistic participants reported significantly lower mean scores on the Restraint subscale ( $U = 1004, p < .05$ ). Whilst more autistic participants scored above the threshold for clinical significance on all subscales compared to non-autistic men apart from the Restraint subscale, differences were only significant on the Shape Concern subscale ( $X^2(1) = 4.27, p < .05$ ) and the Weight Concern subscale ( $X^2(1) = 4.44, p < .05$ ). Autistic men were not significantly more likely than non-autistic men to regularly engage in eating disordered behaviours.

There was no significant correlation between the EDE-Q Global score and the AQ-Short total score, or the HADS depression score in the autistic group. There was a significant positive correlation between the EDE-Q Global score and the HADS anxiety score ( $r = 0.52, p < 0.01$ ) and BMI ( $r = 0.31, p < .05$ ).

## Discussion

The aim of this study was to explore self-reported ED symptoms in autistic men. Autistic men scored significantly higher in the areas of Eating, Shape and Weight Concern, and the Global summary score, as measured by the EDE-Q compared to non-autistic men. However, they scored significantly lower in the area of dietary restraint. Correlational analyses suggest that these heightened symptoms may be related to the heightened levels of anxiety in this population, and higher BMIs, rather than the degree of autistic traits.

That anxiety, and not autism, was found to relate to ED symptoms in autistic men is potentially positive for the prognosis for autistic men experiencing ED behaviours: whilst autism is a lifelong condition, anxiety can be treated with interventions specifically tailored to autistic individuals <sup>27</sup>. This suggests that, rather than being an inherent part of autism, co-occurring ED behaviours may potentially improve with a reduction in anxiety. Approximately 50% of autistic adults experience an anxiety disorder at some point in their lifetime, and anxiety is also known to be heightened in AN <sup>14-17</sup>. With this study supporting a potential relationship between autism, anxiety and ED symptoms, future research should explore whether anxiety in autism could potentially act as a risk factor for the future development of an ED or as a shared mechanism: a recent systematic review indicates that the high prevalence of social anxiety seen in AN could also be linked to heightened autistic traits in this population <sup>18</sup>.

BMI was also found to correlate with higher global scores on the EDE-Q in autistic men. In non-autistic populations, heightened EDE-Q scores are similarly associated with being in an overweight or obese BMI range <sup>19</sup>. This may be particularly relevant for autistic people as, consistent with this present study, previous literature suggests that autistic people are more likely to have a BMI defined as overweight or obese. This has led to suggestions that autism may be associated with eating behaviours relating to excessive energy intake <sup>6,20-22</sup>. At present autism has been most explored in the ED literature from the perspective of co-occurring AN in women, an ED associated with low weight and dietary restriction. However, the finding of this



study that autistic men in fact scored significantly lower than non-autistic men on measures of dietary restraint suggests a need for research on non-restrictive disordered eating behaviours in autism.

This report was intended as an exploratory study in the context of a lack of prior research in this area. Consequently, there are a number of limitations, including the reliance on self-report for the presence and validation of an autism diagnosis, demographic data (including height and weight), and eating disorder history and symptomatology. Further research should consider exploring the issues raised in this report in the context of a more controlled study, including more accurate assessments of autism status, and a larger sample size.

### ***Conclusions***

Autistic men appear to experience elevated levels of ED symptomatology. However, this is not in the areas of dietary restraint highlighted by previous research into AN and autism<sup>23</sup>. The elevated ED behaviours found in this sample may be related to the heightened levels of anxiety and higher BMIs seen in the autistic group, rather than autistic traits themselves.

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